

the fixed service. The greatest sharing constraints are associated with potential interference to satellite receivers in MSS (Earth-to-space) allocations and to fixed service receivers in MSS (space-to-Earth) allocations. Because large geographic areas are visible to a satellite, high aggregate levels of interfering signal power can be received by a satellite as a result of the potentially large numbers of interfering fixed stations and there is a significant probability that antenna main beams of one or more fixed systems will be directed temporarily at non-GSO satellites or permanently at GSO satellites (unless orbit avoidance is used). These sharing problems incur the greatest design and operating constraints because, among other things, interference could be caused or experienced by fixed stations located far outside the service area of an MSS network. In contrast, sharing between mobile earth stations and fixed stations is considered to be a local problem that can be addressed using the concept of coordination area (e.g., in accordance with ITU-R Recommendations IS.847, IS.848, IS.849 and IS.850).

a. Non-GSO MSS sharing with the fixed service

Sharing studies in ITU-R Task Group 2/2 focussed on the bands 1970 - 2010/2160 - 2200 MHz and 1610 - 1626.5/2483.5 - 2500 MHz, since these are of immediate interest for implementation of MSS networks. Based on these studies it was concluded that in the Earth-to-space direction sharing is generally not feasible given current arrangements, and some regulatory options are suggested to facilitate the introduction of MSS. With regard to sharing in the space-to-Earth direction it was concluded that such sharing should be feasible, if necessary by undertaking bilateral coordinations. A draft new Recommendation ITU-R IS. [Document 2/6] was developed to provide power flux density (pfd) and fractional degradation in performance (fdp) thresholds that are used to establish the need for coordination.

It is evident from the above conclusions that with respect to sharing, the usage of spectrum by MSS would affect the fixed service usage differently in the Earth-to-space and space -to-Earth directions. The actual impact of the introduction of MSS services in these bands concerned will largely depend on the extent of usage by the fixed service, and the changes made to channelization plans used by administrations.

In view of the differences in impact, different measures need to be taken by the fixed service and MSS in the early stages of MSS introduction so as to minimize the burden of transition of the fixed service, while at the same time permitting gradual introduction of the MSS. For example, in the short-term, in the Earth-to-space direction, the transition of the affected fixed service systems to other bands would be required in an earlier time-frame than for the fixed service systems affected in the space-to-Earth direction. However, in the long-term, as MSS traffic and spectrum requirements build up, sharing in both directions will become increasingly complex and difficult and eventual transitional arrangements for the fixed service to other bands are likely to be required.

b. GSO MSS sharing with the fixed service

Coordination guidelines for sharing frequencies between MSS (space-to-Earth) and the fixed service were addressed in a draft new Recommendation ITU-R IS. [Document 2/7]. This Recommendation provides pfd coordination thresholds that are consistent with RR 2566 for all the downlink bands allocated by WARC-92, with the exception of the 2520 - 2535 MHz band where a more stringent threshold value was adopted. Fixed system considerations that may facilitate successful coordination are addressed in an annex. The Recommendation states that co-channel sharing between MSS (Earth-to-space) and the fixed service is unworkable, and Task Group 2/2 was of the view that provisions should be made for avoiding co-channel sharing.

3.3.2.4. Sharing with the mobile (aeronautical telemetry) service

The band 1492-1525 MHz is allocated to the MSS (space-to-Earth) service in Region 2. The band is also allocated to the aeronautical mobile (telemetry) service in Region 2. In particular, the U.S. makes extensive use of this band for the testing of aircraft and associated avionics. Studies have shown that the power flux-density (pfd) generated in the same area as telemetry receiving stations must be limited to low levels in order to protect the telemetry receivers. The disparity between acceptable pfd levels and the pfd levels generated by MSS satellite downlinks has led to the conclusion that co-frequency, co-coverage sharing is not feasible. Because of the extensive frequency usage by telemetry systems, the spectrum available to MSS under non-co-frequency operation with co-coverage may be extremely limited unless both services take appropriate technical and operational measures to minimize the potential for interference. However, co-frequency, non-co-coverage operation is possible where sufficient separation can be achieved between the operational areas of the telemetry systems and the MSS coverage area. In this case, MSS coverage of portions of South America may be possible on a co-frequency basis.

3.3.2.5. Sharing with the mobile service (FPLMTS)

MSS (space-to-Earth) and (Earth-to-space) networks cannot share frequencies with the terrestrial component of FPLMTS in the same and adjacent geographic areas. However, sharing with MSS (space-to-Earth) may be feasible in a non-co-frequency, co-coverage environment.

3.3.2.6. Sharing with other mobile services

The criteria under development for sharing between the MSS (space-to-Earth) and receiving stations in the fixed service may also adequately protect mobile services, although further study is needed. Some systems in the mobile service (e.g., transportable equipment used for electronic news gathering) appear to be similar to certain types of

fixed systems (e.g., point-to-multipoint systems). It is noted that in RR Article 28 (pdf limits on transmitting space stations) and Appendix 28 (parameters for calculation of coordination area), no distinction is made between systems in the terrestrial services (e.g., fixed and mobile). Thus, for the time being, it is reasonable to assume that sharing between general mobile services and the MSS is no more constraining than sharing between MSS and the fixed service.

3.3.2.7. Sharing with the meteorological aids service

The band 1675 - 1700 MHz is shared on a co-primary basis between MSS (Earth-to-space) and the meteorological aids service. Further study of the feasibility of sharing is required.

3.3.2.8. Sharing with the aeronautical radionavigation service

The 1610-1626.5 MHz band is shared between the aeronautical radionavigation service and MSS (Earth-to-space) on a co-primary basis. An analysis of sharing with respect to the high-power radars operated in the aeronautical radionavigation service by one administration indicates that no interference will be caused by transmitting mobile earth stations operating outside the territory of that administration. The analysis also indicates that under conditions of mutual visibility, the radars will generate high levels of interfering signal power at MSS satellite receiver; however, cooperative discussions among the parties involved and implementation of certain interference-mitigation techniques may eliminate the potential interference in the MSS networks, at least possibly for MSS service areas outside of the territory of the administration operating the aeronautical radionavigation system.

The potential for MSS interference to satellite-based aeronautical radionavigation systems operating at 1575.42 MHz (GPS) and 1602-1616 MHz (GLONASS) is under study. Recommendation ITU-R M.1088 gives information related to protection of GPS.

The administration operating the radionavigation-satellite system pursuant to RR 732 (GLONASS) has indicated its intent to implement a revised frequency plan by the year 2005. In addition, the plan would implement the filtering of out-of-band emissions in the 1610.6-1613.8 MHz and 1660-1670 MHz bands in order to protect radio astronomy observations. The revised frequency plan also includes a transition period from 1998 to 2005. The U.S. interests working within RTCA to develop a proposed out-of-band emission mask to protect GLONASS operations up to 1605 MHz for possible use as a component of the GLOBAL Navigation Satellite System (GNSS).

3.3.2.9. Sharing with the radiolocation service

The 2483.5-2500 MHz band is shared on a co-primary basis between MSS (space-to-Earth) and the radiolocation service. The radiolocation service is also allocated in the wider, adjacent bands spanning 2300 - 2483.5 MHz. One analysis indicates that MSS satellites operating at the pfd levels currently allowed under RR 2566 may interfere with radars in the radiolocation service. The possibility for radiolocation stations to avoid use of the 2483.5-2500 MHz band should be considered.

3.3.3 Generic Allocations

1530-1544/1626.5-1645.5 MHz and 1545-1559/1646.5-1660.5 MHz

The United States proposes to change the current allocations for the separate Aeronautical Mobile Satellite (Route) Service (AMS(R)S), Land Mobile Satellite Service (LMSS), and the Maritime Mobile Satellite Service (MMSS) into the Mobile Satellite Service (MSS).

A necessary and integral part of this proposal is the inclusion of footnotes that protect maritime mobile satellite distress and safety service in the lower L-band (1530-1544/1626.5-1645.5 MHz) and aeronautical safety service in the upper L-band (1545-1559/1646.5-1660.5 MHz). To provide this protection, the U.S. proposes that the allocation worldwide in the lower L-band worldwide be identical to that specified in footnote 726C (which currently applies only to certain countries including the U.S., Canada, and Mexico) and that the allocation worldwide in the upper L-band identical to that specified in footnote 730C (which also currently applies only to certain countries).

Additionally, the allocation at 1525-1530 MHz in the lower L-band should be made generic worldwide and the United States is reviewing the applicability of RR 726C to this band. The worldwide allocation at 1660-1660.5 MHz should be the same as in footnote 730C, which will continue to protect radio astronomy services. Finally, the priority and preemptive access requirement throughout the upper and lower L-bands is an intra-system requirement only.

Historically, there has been continued progress toward generic allocations domestically and internationally. The initial allocations were made in the 1970's to maritime and aeronautical services because discrete systems were being proposed for these users. With the evolution of INMARSAT from maritime service to aeronautical and land mobile services and the failure of attempts to establish a dedicated aeronautical system, the U.S. government took the lead in promoting a shift toward a generic allocation. U.S. proposals at the World Administrative Radiocommunications Conference (WARC-MOB-87) in 1987 were successful only in adding secondary LMSS allocations in the existing bands. As a result, the U.S. took reservations with respect to these allocations. Protocol No. 58 WARC-MOB-87.

U.S. efforts met with greater success at WARC-92. There, the conference adopted footnotes (726C and 730C) establishing additional allocations for Argentina, Australia, Brazil, Canada, Malaysia, Mexico and the U.S. specifying a primary allocation to generic MSS, with appropriate safeguards for maritime safety and distress communications in the lower L-band and for aeronautical safety communications in the top 4 MHz of the upper L-band. Unfortunately, 10 MHz (1545-1555/1646.5-1656.5 MHz) of the upper L-band was not made generic, by footnote or otherwise. WRC-93, which was largely an agenda-setting conference, agreed to include for consideration at WRC-95 the improvement of the existing MSS allocations, an item that includes proposals to make the allocations generic.

The FCC in recent years has consistently supported generic MSS allocations with appropriate safeguards for the priority of aeronautical and maritime safety communications. See Memorandum Opinion and Order in Gen. Docket No. 84-1234 (1989) (allocating the upper L-band to be shared by generic MSS and aeronautical MSS); see also First Report and Order and Further NPRM in Gen. Docket No. 90-56, 8 FCC Rcd 4246 (1993) (allocating the 1530-1544/1626.5-1645.5 MHz band to generic MSS and proposing to allocate the 1525-1530 MHz band to generic MSS). WRC-95 provides an opportunity for the U.S. to promote, once again, the efficiencies of generic allocations.

3.4 Date of Entry Into Force

3.4.1 Introduction

Agenda item 2.1.b) of WRC-95 is to review the date of entry into force of MSS allocations in the bands 1980-2010 MHz and 2170-2200 MHz in Regions 1 and 3 and the bands 1970-2010 MHz and 2160-2200 MHz in Region 2 (the 2 GHz MSS allocations). These bands were allocated to the MSS at WARC-92. They are also allocated to the mobile and fixed services on an equal primary basis and are subject to the provisions of RR 746B and 746C. RR 746B states that the use of these bands "...shall not commence before 1 January 2005..." An exception to this date of entry into force exists in RR 746C which states "In the United States of America, the use of the bands ...shall not commence before 1 January 1996."

3.4.2 MSS Requirements for Access to the 2 GHz Bands

Between WARC-92 and September 1994 more than 20 MSS systems, both GSO and NGSO, have been Advanced Published in the 2 GHz bands. Some of these NGSO systems are intended to provide a worldwide service with implementation dates between 1994 and 2000. Two U. S. companies have applied to the FCC to construct GSO MSS systems in this band. These systems could be operational before the year 2000.

The other bands allocated to the MSS, 1610-1626.5/2483.5-2500 MHz, are likely to become saturated prior to the year 2005. As of September 1994, 43 GSO and NGSO

systems have been published in the ITU records. The number of these systems, their technical and operational characteristics such as global coverage and omni-directional antenna patterns and the constraints imposed by sharing the spectrum with other services all serve to reduce the usable spectrum for MSS.

3.4.3 Impact of FPLMTS

RR 746A indicates that the bands 1885-2025 MHz and 2110-2200 MHz are intended for use, on a worldwide basis, by Administrations wishing to implement the future public land mobile telecommunication systems (FPLMTS). Although such use does not preclude the use of these bands by other services to which the bands are also allocated.

The ITU-R Recommendations which define the terrestrial and satellite components of FPLMTS are optimistically expected by the end of 1997. Typically, there is a five year period between the start of satellite construction and provision of service. Realistically, it is likely that a U.S. MSS FPLMTS system will not be operational prior to the year 2005. However, some MSS operators planning to provide services at 2 GHz around the year 2000 plan to maintain sufficient flexibility in their systems designs to implement and operate their systems in a manner consistent with FPLMTS Recommendations.

Changing the date of entry into force to an earlier date would mean less spectrum would be available to the satellite component of FPLMTS if part of the 2 GHz allocations were used for MSS not compatible with FPLMTS.

3.4.4 Sharing with the Fixed Service

Earth-to-space: ITU-R studies show that the aggregate interference from FS transmitters in densely used parts of the 1980-2010 MHz band within visibility of NGSO MSS satellites would be unacceptable. Because of this unacceptable level of interference ITU-R task Group 2/2 concluded that a phased transition plan could be used to facilitate the introduction of MSS in the band 1980-2010 MHz.

space-to-Earth: ITU-R studies indicate that when detailed NGSO MSS and FS system characteristics are taken into account sharing between NGSO MSS and typical short haul analogue and digital FS systems could be feasible in the band 2170-2200 MHz, especially when MSS traffic levels are low. In the long term, when MSS traffic levels are high, sharing will be difficult unless appropriate technical modifications or transitions are made to fixed systems. If sharing constraints were relaxed, the capacity of the MSS systems could be improved.

One means to provide for the introduction of MSS in the 2 GHz bands around the year 2000 would be to use non-overlapping portions of the spectrum in the ITU-R channel plans for the fixed service in both the uplink and downlink bands. However it is unlikely

that common non-overlapping spectrum could be found on a global basis.

3.4.5 Conclusion

During the CPM it was noted that administrations wishing to implement MSS systems considered that transitional arrangements could be prepared for a possible phased entry of MSS systems progressively by implementing the MSS bands allocated by WARC-92 starting earlier than the year 2005 where increasing amounts of spectrum, up to the total allocated to MSS, could be released over a longer time period. Administrations could place priority on the removal of those FS systems which are eligible for retirement from service or part of network modernization programs and which are located in the MSS spectrum. Consideration could be given to re-establishing service in accordance with Recommendation ITU-R F. 1098, Annexes 1 and 2. Earlier transition arrangements for the FS in the MSS Earth-to-space bands could be considered given the especially severe sharing difficulties. In the MSS space-to Earth bands, as some degree of sharing with certain fixed-service systems may be possible subject to detailed coordination, it may be possible to "extend" the migration time-frame for these fixed systems beyond the year 2005. these actions may be considered as burden sharing by both services. The upper portions of the 2 GHz global MSS allocations, approximately the upper half of the allocations, may be considered as the potential, preferred frequency sub-bands for unconstrained access by MSS systems earlier than 2005. These sub-bands correspond to the nominal non-overlapping portions of Recommendation ITU-R F.283-5 channel arrangements but may not be consistent with channel arrangements used by some administrations.

Other administrations concerned with the effect of the MSS on their FS systems considered that the review of the date 2005 is to be considered by WRC-95 on the basis of the difficulties they encounter in removing FS systems whose replacement may result in relatively severe economic impact. They considered that action other than the application of Recommendation ITU-R F.1098 may impose more severe consequences.

The U.S. should propose no change to RR 746C. At the same time the U.S. should adopt a position to support the development of a transition plan to gradually introduce MSS in the 2 GHz bands starting some time prior to the year 2005.

A report of the 2 GHz Transition Plan Ad Hoc Group to IWG-3 appears in Annex 3.8.3.

3.5 Additional MSS Allocations As Necessary

WRC-95 agenda item 3(d) calls for the consideration of the requirements for the MSS and if necessary adopt limited allocations in 1995.

3.5.1 Adequacy of Existing Allocations

IWG-3 has conservatively estimated that the total MSS spectrum requirements will range from 150 to 300 MHz by the year 2005. See section 3.2 above. It is clear from the previous sections that the existing allocations are insufficient to satisfy these requirements and that additional spectrum will have to be allocated by WRC-95 to the MSS.

The usability of the 68 MHz at 1525-1559/1626.5-1660.5 MHz can be enhanced by making the allocations generic MSS as discussed in Section 3.3.3 above. The 33 MHz at 1610-1626.5/2483.5-2500 MHz can be enhanced for non-GSO MSS with changes to certain of the footnotes as discussed in Section 3.3.1(b) above. However, these bands are barely sufficient for accommodating only the currently licensed GSO and soon to be licensed non-GSO MSS systems. Moreover, international coordination of U.S. systems in these bands will be difficult in light of the large number of systems proposed by other countries in these bands.

MSS growth will have to be accommodated in other bands between 1 and 3 GHz. However, all such bands are currently being used by other services. In particular, the committee does not consider the 33 MHz at 1492-1525 MHz, the 20 MHz at 1970-1990 MHz, or the 70 MHz in the 2500-2690 MHz band to be available for meeting United States MSS requirements. The usability of the 80 MHz of secondary Region 2 allocations at 1930-1970 and 2120-2160 MHz is also questionable. In addition, the 33 MHz at 1492-1525 MHz, the 35 MHz at 1675-1710 MHz and the 100 MHz at 1930-1980/2170-2200 MHz is not usable by non-GSO MSS systems since these allocations are limited to Region 2. Thus, a total of 238 MHz out of the total of 399 MHz of MSS allocated spectrum (i.e. approximately 60%) may not be usable as a practical matter to satisfy United States MSS spectrum requirements, leaving only 161 MHz available to satisfy the identified MSS spectrum requirements, both GSO and non-GSO.

For these reasons, the preliminary conclusion of the committee is that the United States should propose additional MSS allocations under this agenda item as discussed in the next subsection.

3.5.2 Potential Candidate Bands for New Allocations

Additional spectrum is needed to meet the demand for mobile services. To ensure that there are enough bands to meet demand, the United States needs to secure additional spectrum. Potential new MSS allocations include 2010-2025, 2165-2170 and possibly others. Attaining more spectrum is critical for future Mobile Satellite Services in the United States and the WRC-95 provides an ideal opportunity for the U.S. to express interest in these bands and possibly attain new MSS allocations in these bands. The band 1559-1569 MHz is a possible candidate for discussion relative to WRC-97.

2010-2025 MHz and 2165-2170 MHz

Since WRC-93, the FCC allocated the 1970-1990 MHz band to terrestrial PCS, thereby precluding operation of MSS despite an international MSS allocation in the bands. Thus, additional MSS allocations are needed in the vicinity of the 2 GHz bands.

A potential new MSS allocation at 2010-2025 MHz has been proposed in the FCC proceeding in preparation for WRC-95. The band is allocated internationally and domestically to the Fixed and Mobile Services. In the United States, the band is part of a larger (1990-2110 MHz) used primarily by broadcasters for auxiliary services in the U.S., including electronic news gathering. There is also a proposal to make the 2165-2170 MHz band a global allocation. Power limits on terrestrial systems will be required in order to ensure enough useable spectrum for MSS systems.

The global and U.S. dates of entry for these new allocations should be consistent with those adopted by WARC-92 for the adjacent bands (see Nos. 746B and 746C). Specifically, global and U.S. dates of entry for the new allocations would be 1 January 2005 and 1 January 1996, respectively. possible eventual decoupling of the dates of entry for the existing and new 2 GHz allocations should be addressed in development of the U.S. position.

1675-1710 MHz (Earth-to-space) - this band is allocated for MSS use in Region 2 only

Sharing analyses demonstrate the feasibility of sharing with meteorological satellite. Further work is required to address sharing with METAIDs which are primarily used in the United States. Consideration should be given to expanding the allocation to all three regions.

3.6 Regulatory Issues

3.6.1 Introduction

Under agenda item 4 for WRC-95 it may be necessary to make certain consequential changes to the Radio Regulations. This section identifies what some of these changes may be particularly in relation to Resolution 46. This Resolution is associated with a number of 1-3 GHz MSS allocations. The items below relate to those regulatory procedures which concern Resolution 46 and its application.

3.6.2 Resolution 46 Technical and Operational Improvements

There are several constraints in Resolution 46 footnotes which relate to its application where improvements could be made. These are discussed below.

3.6.2.1 PFD Thresholds

Some Resolution 46 footnotes indicate the PFD threshold conditions under which Resolution 46 is to be applied. It is applied if the PFD thresholds of RR 2566 are exceeded. The CPM has recommended different thresholds than those in RR 2566 be used in different bands. Appropriate modifications to footnotes will be proposed.

3.6.2.2 E.I.R.P. Density

In RR 731E a maximum e.i.r.p. density limit is specified, but it is not indicated as to whether it is peak or average. The CPM has indicated that peak should be used in the part of the band where a system is operating in accordance with RR 732 (1610-1616 MHz), and mean in the other part of the allocation (1616-1625.5).

3.6.3 Resolution 46 Coordination

Section II of Resolution 46 relates to space segment coordination; Section III relates to Earth Segment coordination. Several modifications to Resolution 46 are needed to accommodate several improved coordination methods. These are intended to make the associated MSS allocations more useable.

3.6.3.1 System Specific Coordination (SSC)

Recommendation ITU-R IS. [Doc.2/8] contains a methodology to be used in coordination when the PFD threshold in a particular MSS 1-3 GHz allocation is exceeded. This procedure would come into effect when the PFD threshold is greater than that specified in the associated footnote. Section 2.5 of Resolution 46 provides for identifying with which Administration coordination should take place. The Appendix describes a method which would be applied to coordinate the Non-GSO-MSS system with terrestrial systems. The CPM-95 has adopted a draft new Recommendation on this method.

3.6.3.2 Coordination Region

Resolution 46, Section II outlines the procedures for assignment and coordination of the frequencies of a space station in an MSS network. Paragraphs 2.1 and 2.2 specify that Administrations shall affect coordination of satellite networks and stations of terrestrial networks "where assignments might be affected" The area containing those assignments which might be affected is the coordination region.

A method to calculate the coordination region is described in the draft new Recommendation ITU-R M.[Doc.8/45]. Resolution 46 needs to be modified to accommodate the use of this method.

3.6.3.3 Coordination Area

The area currently defined in Note 1 of Section III of Resolution 46 is considered to be too large and likely to lead to unnecessary coordination. It has been concluded by CPM-95 that this coordination area should be calculated using the method of Recommendation ITU-R IS 847 except for aircraft stations where a coordination distance of 500 Km and the method of ITU-R IS850 should be used.

This approach needs to be provided for in an appropriate modification of Resolution 46. Working Party 8D has produced a draft Recommendation on this method.

3.6.4 Additional Provisions

There are several areas related to Resolution 46 which have been identified for its improvement.

3.6.4.1 Interference From New FS

New FS transmitters could cause excessive interference to existing MSS systems. Currently Resolution 46 does not provide for any protection from such stations. The BR is not required to carry out any examination of the FS notices with regard to the protection of receiving space stations in Resolution 46 bands. The Working Party of the CPM is being asked to develop an appropriate amendment to Resolution 46.

3.6.4.2 Additional Information

The information provided in Appendix 3 is not sufficient to carry out necessary calculations relating to Non-GSO MSS satellite networks. Regulatory provisions need to be made to provide for such information.

3.6.4.2.1 The orientation of the satellite transmitting antenna beams to permit improvement in PFD calculation.

3.6.4.2.2 A list of the information which should be sent in connection with the provisions of Section 2.8 of Res. 46.

3.6.4.2.3 The type of multiple access and modulation and the maximum and average beam peak e.i.r.p./4 KHz and e.i.r.p./1 MHz for each beam should be submitted in order to better represent the interference potential and to do representative interference analyses.

3.6.5. Application of Res. 46 to the 1525-1559/1626.5-1660.5 MHz Bands

Resolution 46 was adopted at WARC-92 to provide interim procedures for the coordination of NGSO satellite systems with other services. The procedures are to be

applied only in frequency bands in which specific reference is made to Resolution 46 in footnotes to the Table of Allocations (e.g., Footnote 726D). The U.S. and the U.K. together took a Reservation to the Final Acts stating that they will not apply Resolution 46 to geostationary satellite systems in certain frequency bands, e.g., the 1525-1559/1626.5-1660.5 MHz bands.¹ The purpose of the separate statement was to ensure that existing systems, such as the INMARSAT and the AMSC systems, would not be subject to additional coordination procedures. At WRC-95, the U.S. should clarify this position with appropriate language in the allocations.

3.6.6. Summary

This section has identified areas where Regulatory/Procedural proposals need to be developed for WRC-95. In the Appendix are excerpts from ITU-R documents which provide more detailed descriptions of the methods and calculations referenced in the text.

3.70 Proposals

In the proposals that follow there are numerous references to ITU-R Draft or approved Recommendations. The appropriate means and advisability of incorporating these by reference has not as yet been established.

3.7.1 Sharing Proposals

MOD 731E

The use of the band 1610-1626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to the application of the coordination and notification procedures set forth in Resolution 46 (WRC-95). A mobile earth station operating in either of the services in this band shall not produce a peak e.i.r.p. density in

¹ See Final Protocol No. 679 WARC-92 Final Acts. The text reads:
Referring to statements relating to the frequency range below 3 GHz concerning mobile-satellite services, it is necessary to highlight an oversight in drafting and reading texts which could lead to a new and unnecessary burden of coordination between geostationary space stations and terrestrial services in certain frequency bands. Accordingly, the above Administrations will not accept any commitment for this form of coordination arising from omission of the term "non-geostationary" in the text of certain footnotes, e.g. Footnote Nos. 726x and 7xx, to the Table of Frequency Allocations in Article 8. This reservation is made on behalf of all national and international organizations for whose frequency assignments the two countries are the notifying Administrations.

excess of -15 dB (W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. 732, unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, a mean value of -3 dB (W/4 kHz) is applicable. ~~Stations of the mobile satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 732 and stations in the fixed service operating in accordance with the provisions on No. 730.~~

Reason Inclusion of the terms "peak" and "mean" are intended to clarify how the e.i.r.p. density limit should be measured. The text proposed for deletion at the end of this provision is unnecessary to protect the primary allocation status of the identified services and creates confusion and ambiguity concerning the primary status of the mobile-satellite service in the 1610-1626.5 MHz band.

SUP 733E ~~Harmful interference shall not be caused to stations of the radio astronomy service using the band 1610.6-1613.8 MHz by stations of the radiodetermination satellite and mobile satellite services. (No. 2904 applies.)~~

Reason This provision is unnecessary to protect the primary allocation status of radio astronomy and creates confusion and ambiguity concerning the status of the satellite services that are allocated on a primary status in the 1610-1626.5 MHz band.

MOD 746B In the band 2160-2200 MHz coordination of space stations of the mobile-satellite service with respect to terrestrial services is required only if the power flux density or Fractional Degradation Percentage at the Earth's Surface exceeds the threshold limits in No. 2566, in Recommendation ITU-R IS. [Document 2/6].

NOC 746C In the United States, the use of the bands 1970-2010 MHz and 2160-2200 MHz by the mobile-satellite service shall not commence before 1 January 1996

Reason this facilitates the early introduction of emerging mobile-satellite technology.

MOD 753F The use of the band 2483.5-2500 MHz by the mobile-satellite service and the radiodetermination-satellite service is subject to the application of the coordination and notification procedures set forth in Resolution 46 (WARC-92). Coordination of space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services is required only if the power-flux density produced at the Earth's surface exceeds the limits in No. 2566.

-150 dB (W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-150 + 0.65 (δ-5) dB (W/m²) in any 4 KHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-137 dB (W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space conditions. (See Recommendation ITU-R IS. [Document 2/6]).

In respect of assignments operating in this band, the provisions of Section II, paragraph 2.2 of Resolution 46 (WARC-92) shall also be applied to geostationary transmitting space stations with respect to terrestrial stations.

Reason To facilitate the introduction of mobile-satellite systems in this band while providing adequate protection of analog point-to-point and multipoint fixed systems in the band.

3.7.2 New Allocations

MHz
1525 - 1530

Allocation to Services		
Region 1	Region 2	Region 3
1525 - 1530 SPACE OPERATION (space-to-Earth) FIXED <u>MOBILE-SATELLITE</u> (space-to-Earth) MARITIME MOBILE-SATELLITE (space-to-Earth) Land Mobile-Satellite (space-to-Earth) 726B Earth Exploration-Satellite Mobile except aeronautical mobile 724 722 723B 725 726A 726D	1525 - 1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Earth Exploration-Satellite Fixed Mobile 723 722 723A 726A 726D	1525 - 1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) Earth Exploration-Satellite Mobile 723 724 722 726A 726D

Reason: To make allocation generic.

MHz
1530 - 1533

Allocation to Services		
Region 1	Region 2	Region 3
1530 - 1533 SPACE OPERATION (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth) MARITIME MOBILE SATELLITE (space-to-Earth) LAND MOBILE - SATELLITE (space-to-Earth) Earth Exploration-Satellite Fixed Mobile except aeronautical 722 723B 726A <u>726C</u> 726D	1530 - 1533 SPACE OPERATION (space-to-Earth) MARITIME MOBILE-SATELLITE (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth) LAND MOBILE SATELLITE (space-to-Earth) Earth Exploration-Satellite Fixed Mobile 723 722 726A 726C 726D	

MOD 726C

The band 1530 -1544 MHz is allocated to the mobile-satellite (space-to-Earth) service, and the band 1626.5 - 1645.5 MHz is allocated to the mobile-satellite (Earth-to-space) service, on a primary basis subject to the following conditions: maritime mobile-satellite distress and safety communications shall have priority access and immediate availability over all other mobile-satellite communications operating under this provision. Communications of mobile-satellite system stations not participating in the global maritime distress and safety system (GMDSS) shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

Reason: To make allocation generic.

MHz
1533 - 1559

Allocation to Services		
Region 1	Region 2	Region 3
1533 - 1535	1533 - 1535	
SPACE OPERATION (space-to-Earth)	SPACE OPERATION (space-to-Earth)	
MARITIME	MARITIME MOBILE-SATELLITE	
MOBILE-SATELLITE (space-to-Earth)	(space-to-Earth)	
<u>MOBILE-SATELLITE</u> (space-to-Earth)	<u>MOBILE-SATELLITE</u> (space-to-Earth)	
Earth Exploration-Satellite	Earth Exploration-Satellite	
Fixed	Fixed	
Mobile except aeronautical mobile	Mobile 723	
Land Mobile	Land Mobile Satellite	
Satellite (space-to-Earth) 726B	(space-to-Earth) 726B	
722 723B 726A <u>726C</u> 726D	722 726A 726C 726D	
1535 - 1544 MARITIME MOBILE-SATELLITE (space-to-Earth) Land Mobile-Satellite (space-to-Earth) 726B <u>MOBILE-SATELLITE</u> (space-to-Earth) 722 726A 726C 726D 727		
1544 - 1545 MOBILE-SATELLITE (space-to-Earth) 722 726D 727 727A		

000101

Allocation to Services		
Region 1	Region 2	Region 3
1545 - 1555 AERONAUTICAL MOBILE SATELLITE (R) (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth) 722 726A 726D 727 729 729A 730 <u>730C</u>		
1555 - 1559 LAND MOBILE SATELLITE (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth) 722 726A 726D 727 730 730A 730B 730C		

Reason: To make allocations generic and to provide priority access and immediate availability for aeronautical and maritime distress and safety communications.

MOD 730C

The band 1545 - 1559 MHz is allocated to the mobile-satellite (space-to-Earth) service, the band 1646.5 - 1660 MHz is allocated to the mobile-satellite (Earth-to-space) service, and the band 1660 - 1660.5 MHz is allocated to the mobile-satellite (Earth-to-space) and radio astronomy services, on a primary basis subject to the following conditions: the aeronautical mobile-satellite (R) service shall have priority access and immediate availability over all other mobile-satellite communications within a network operating under this provision; mobile-satellite systems shall be interoperable with the aeronautical mobile-satellite (R) service; account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

MHz
1626.5 - 1660.5

Allocation to Services										
Region 1					Region 2			Region 3		
1626.5 - 1631.6					1626.5 - 1631.5					
MARITIME MOBILE					MOBILE-SATELLITE					
SATELLITE					(Earth-to-space)					
(Earth-to-space)										
<u>MOBILE-SATELLITE</u>										
<u>(Earth-to-space)</u>										
Land Mobile-Satellite										
(Earth-to-space) 726B										
722	726A	<u>726C</u>	726D	727	722	726A	726C	726D	727	730
730										
1631.5 - 1634.5 MARITIME MOBILE SATELLITE (Earth-to-space)										
(space-to-Earth)										
LAND MOBILE-SATELLITE (Earth-to-space)										
(space-to-Earth) 726B										
<u>MOBILE-SATELLITE</u>										
<u>(Earth-to-space)</u>										
722 726A 726C 726D 727 730 734A										
1645.5 - 1646.5 MOBILE-SATELLITE (Earth-to-space)										
722 726D 734A										
1646.5 - 1656.5 <u>MOBILE-SATELLITE (Earth-to-space)</u>										
AERONAUTICAL MOBILE SATELLITE (R)										
(Earth-to-space)										
722 726A 726D 727 729A 730 <u>730C</u> 734A										
1656.5 - 1660 <u>MOBILE SATELLITE (Earth-to-space)</u>										
LAND MOBILE-SATELLITE (Earth-to-space)										
722 726A 726D 727 730 730A 730B 730C 734A										

Allocation to Services		
Region 1	Region 2	Region 3
1660 - 1660.5 RADIO ASTRONOMY LAND MOBILE-SATELLITE (Earth-to-space) <u>MOBILE-SATELLITE (Earth-to-space)</u> 722 726A 726D 730A 730B 730C 736		

Reason:

To make allocations generic and to provide priority access and immediate availability for aeronautical and maritime distress and safety communications.

000164

MHz
1675 - 1710

Allocation to Services		
Region 1	Region 2	Region 3
1675 - 1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MOBILE SATELLITE (Earth-to-space) 722		
1690 - 1700 METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE (space-to-Earth) <u>MOBILE SATELLITE</u> <u>(Earth-to-space)</u> Fixed Mobile except aeronautical mobile 671 722 741	1690 - 1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) <u>MOBILE SATELLITE</u> <u>(Earth-to-space)</u> 671 722 740 742	

000165

MHz
1700 - 1710

Allocation to Services		
Region 1	Region 2	Region 3
1700 - 1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) <u>MOBILE SATELLITE</u> <u>(Earth-to-space)</u> Mobile except aeronautical mobile 671 722 743A	1700 - 1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile <u>MOBILE SATELLITE (Earth-to-space)</u> 671 722 743 <u>(Earth-to-space)</u>	

000100

MHz
2010 - 2200

Allocation to Services		
Region 1	Region 2	Region 3
2010 - 2025 FIXED MOBILE <u>MOBILE-SATELLITE (Earth-to-space)</u> 746A		

2160 - <u>2165</u> FIXED MOBILE 746A	2160 - 2170 FIXED MOBILE MOBILE-SATELLITE (space-Earth) 746A 726B 746C	2160 - <u>2165</u> FIXED MOBILE 746A
2165 - 2170 FIXED MOBILE <u>MOBILE-SATELLITE</u> (space-to-Earth) 746A		2165 - 2170 FIXED MOBILE <u>MOBILE-SATELLITE</u> (space-to-Earth) 746A

Reason:

To provide additional allocations for the mobile-satellite service.

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APPENDIX 3.8.1
IWG-3 - MSS ABOVE 1 GHZ - LIST OF PARTICIPANTS

Audrey Allison	FCC
Melvin Barmat	Jansky\Barmat
Richard Barnet	TRW
Jeff Binckes	COMSAT Mobile Communications
Sandra Bisbey	Telecommunications Systems
James R. Carroll	SFA
T. Stephen Cheston	Iridium, Inc.
Christine M. DiLapi	Motorola
James G. Ennis	Iridium, Inc.
Richard Evans	AMSC
Ben C. Fisher	Fisher, Wayland
Diane Garfield	State
Thomas Gergely	NSF
Richard Gould	Telecommunications Systems
William Hatch	NTIA
Cecily Holiday	FCC
William Horne	STEL
Donald Jansky	Jansky/Barmat
Andy Haire	MCI
Steven Hepe	Loral Qualcomm
Kris Hutchison	Aeronautical Radio
Ken Keane	Winston & Strawn
David Keir	L,F&L on behalf of TRW
Thomas Keller	VLBMH
Kristi Kendall	FCC
Perry Klein	AMSAT
Damon C. Ladson	FCC
Barry Lambergman	Fletcher Heald
Ronald Lepkowski	CCI
Lon Levin	AMSC
Mark N. Lewellen	Westinghouse
Robert May	U.S. Air Force
Edward Miller	Teledesic
Sam Nguyen	COMSAT Mobile Communications
Kaye Nilson	Compass Rose International
Walter Pappas	for U.S. Coast guard
Mahasti Pourdastan	BA
Jay Ramasastry	LQP/Qualcomm
Brian Ramsay	NTIA
Edward Reinhart	Consultant for Hughes Aircraft
Glenn Richards	Fisher, Wayland
Warren G. Richards	State
Paul Rinaldo	ARRL
Bev Sincavage	LTA
Thomas Sullivan	CSC
Leslie Taylor	Leslie Taylor Associates
Wes Vivian	Wireless Cable Association

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